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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI

WATER LICENCE APPLICATION FORM

Application for: (check one)

X New ___ Amendment ___Renewal ___Assignment

LICENCE NO:
(for NWB use only)

1. NAME AND MAILING ADDRESS OF APPLICANT/LICENSEE

Applicant: Mr. Baljinder Brar
Project Officer, Projects Division
Department of PW&S, GN, Kitikmeot Region
PO Bag 200
CAMBRIDGE BAY, NU X0B 0C0
Phone: *(867) 983-4156*
Fax: *(867) 983-4124*
e-mail: *bbrar@gov.nu.ca*

2. ADDRESS OF CORPORATE OFFICE IN CANADA (if applicable)

Consultant: Jivko I Jivkov, P. Eng.
Principal
Jivko Engineering
5610, 50 A Avenue
YELLOWKNIFE, NT X1A 1G3
Phone: *(867) 920-4455*
Fax: *(867) 873-6090*
e-mail: *jivko@TheEdge.ca*

3. LOCATION OF UNDERTAKING (describe and attach a topographical map, indicating the main components of the Undertaking)

The Nunavut Department of Public Works & Services (PW&S) is planning to construct a new Marine Resupply Site for the community of Kugluktuk NU. The client for this development is the Nunavut Department of Community Government & Transportation (CG&T). The Federal Government, in the capacity of agency responsible for the Marine Resupply Infrastructure, is providing the funding.

The community of Kugluktuk (Copper Mine), NU is shown on 1:7,100,000 Nunavut geographic map *(Attachment #1)*. The proposed marine development site is located on the south-west shore of the Coronation Gulf, 1.5 km west of Kugluktuk. The proposed site is shown on the 1:50,000 topographic map 86-0/14 *(Attachment #2)*, and on Canadian Hydrographic Service Chart #7777 *(Attachment #3)*

The co-ordinates of the proposed barge landing site are:

Latitude	115° 08' W
Longitude	67° 48' N

4. DESCRIPTION OF UNDERTAKING (attach plans and drawings)

4.1 Introduction

The proposed Marine Resupply Site will be used for offloading and temporary storage of dry cargo and for offloading fuel delivered with the yearly sealift. The new facility will replace the existing barge landing and staging area located in a congested area downtown Kugluktuk *(Attachment #4)*. It will guarantee deeper water access close to shore for the re-supply vessels and provide significantly larger staging area for the offloaded materials. The site was recommended for development in a Preliminary Engineering Report for Marine Re-supply Relocation Study, Kugluktuk, NU commissioned by the GNWT, Department of Transportation and prepared by the UMA Engineering Ltd. in March 1999. The site was approved by the GN engineering personnel and was fully supported by the local municipal authorities.

The Northern Transportation Company Limited (NTCL) is the exclusive operator of the marine re-supply for Kugluktuk. During the preparation of the Preliminary Design Study and the current design process they provided advise on the location, positioning and parameters of the facility.

4.2 Components & Parameters

The proposed development comprises Breakwater, Causeway/Docking Facility, Marshalling Area, Access Road and Fuel Pipeline with Manifold *(Attachment #5, Attachment #6 and Attachment #7)*. The construction of the Breakwater and the Causeway/Docking facility are subject to this application.

4.2.1 Breakwater

The breakwater will harbour from inclement weather marine re-supply vessels and local subsistence fishing and recreational boats. The vessels used for the re-supply are barges with dimensions 76 m by 17 m and 1.9 m Load Line Draft. A re-supply configuration consists of 3 to 5 barges and a tug.

The proposed Breakwater is approximately 330 m long, 16 m wide at the water line and 2.5 m elevated above the Lowest Normal Tide. The breakwater footprint on the seabed is 5,000 sq. m. Given the existing fetch and the wind speeds, the maximum wave height that the breakwater is designed to handle is 2.0 m. The calculation is based on a mathematical formulation developed by the US Army Corps of Engineers.

The construction of the breakwater involves placing on the seabed of 13,000 cu m clean blasted rock with zero, or very low fines content. Selected large size armour rock will be placed in 1.0 m thick layer on the sea side of the breakwater. The proposed breakwater is situated on top of a shoal 70% of which is less than 1.0 m deep. In order to allow for free migration of water drifted sands along the shoreline and to prevent sedimentation, the breakwater will be detached from the main land.

The protected aquatorium between breakwater and beach is 150 m to 200 m wide and at least 1.9 m deep at Lowest Normal Tide. The size of the aquatorium is sufficient to allow comfortable manoeuvring of re-supply configurations. The aquatorium is naturally protected from the east and, due to the reduced fetch, fairly well protected from the west. The breakwater will provide protection from NNW and NE winds, which generate largest waves during stormy weather.

4.2.2 Causeway/Docking Facility

The proposed Causeway/Docking Facility comprises, Vertical-face Wharf, Access Causeway, and two "Dead-man" Anchors.

- The wharf consists of steel frame structure with 12.5 m long and 1.8 m high timber face. It is in-filled with coarse gravel. The steel columns and bracing are hot dip galvanised for better resistance to corrosion. The timber stringers are of Douglas Fir, impregnated under pressure with creosote oil. Wharves of same design have been installed and operated successfully for a number of years on the re-supply facilities in Paulatuk, NU, Taloyoak, NU and Gjoa Haven, NU.

  The wharf structure will be installed at the end of the causeway, on top of 36.0 m long, 6.6 m wide Hammerhead Base. The elevation at the base of the structure is 0.2 m above the Low Sea Level. In order to protect the gravel in fill from erosion, the structure is recessed 1.8 m from the front edge of the base and a layer of filter fabric is placed on the interface between gravel and rock. The face of the wharf exposed to the sea action is armoured with 0.4 m average size rip-rap to an elevation of 1.0 m above the base.

  The water depth at the toe of the Hammerhead is 1.9 m at Lowest Normal Tide. During offloading operations the barges will bear against the head slope of the hammerhead and will be moored to the Dead-man Anchors on shore. Portable on-board ramps will bridge the gap between wharf and barges.

- The Access Causeway is connecting the wharf to the Marshalling Area located on shore. It is approximately 60 m long and 15.0 m wide at the top. It will be surfaced with 0.1 m gravel layer. The construction of the Access Causeway and the Hammerhead Base involves placing on the beach and on the seabed approximately 5,000 cu m clean blasted rock.

- The "Dead-man" Anchors are located 150 m on each side of the wharf and 21.0 m behind the shoreline. Each Anchor consists of large piece of scrap iron (bulldozer/loader frame, or large size grader blade, etc) buried under at least 2.0 m of rock and gravel fill. Heavy anchor-chain solidly attached to the scrap iron is protruded out of the backfill in the direction of the wharf. Mooring cables from the re-supply vessels will be attached on this anchor chain. Each "Dead-man" is designed for 50 t static pulling force, which is sufficient to guarantee safe moorage for the barges.

4.2.3 Marshalling Area and Access Road

The proposed Marshalling Area and Access Road are located on Commissioner's land, well beyond the High Water Mark to which the sea action extends. The construction of the Marshalling Area and Access Road will involve placing of approximately 5,000 cu m sand obtained from an approved local pit and 5,000 cu m gravel currently stockpiled in the vicinity of the construction site. We contacted the DIAND Lands Division in Yellowknife, NT and they advised us that the construction of the Marshalling Area and Access Road need not to be subject of Land Use or Water License application.

4.2.4 The Fuel Pipeline & Manifold

The proposed Fuel Pipeline will connect the Marine re-supply site with the existing tank farm located several hundred metres south of the barge landing. The Pipeline Manifold will be located on the west limit of the developed area. The construction of the pipeline and the method of transferring fuel from the delivery vessel to the tank farm are subject to a different application.

4.3 General Condition of the Site.

The terrain surrounding the proposed barge-landing site is low, generally flat with occasional shallow water ponds. The area is vegetated with grasses typical of the arctic tundra. The top ground strata consist of grey, well-consolidated fine sand underlie by permafrost. On the east and south the area is surrounded by bedrock hills of height not exceeding 100 m.

The shoreline on the proposed site is gently sloping sand beach exposed to waves from the NNE and NW directions. Fetch length range from 20 km to the NE to 6 km to the NW. The bathymetry along the waterfront indicates a large shoal area approximately 150 m offshore, running parallel to the shore, with water depths between the shore and the shoal of up to 2.0 m. This bathymetry presents the opportunity to develop a partially sheltered harbour by incorporating the shoal into a breakwater.

The beaches in the vicinity of the proposed area are subject to significant wave energy, littoral sand drift and long-shore currents. However, there is no evidence to suggest that ice is a problem. Based upon the local observations the ice remains shore-fast and bottom-fast in the shallows and does not shift around.

4.4 Existing Sea Habitat.

In personal interviews with local residents it was established that, in different time of the year, various species of fish inhabit the Coppermine River and the littoral waters in the vicinity of Kugluktuk. These species include White Fish, Arctic Char, Herring, Caplin, Brown and Black Cod, etc. It was also established that the proposed Marine Resupply Facility would have minimum impact on the livelihood of the local fishermen, since the proposed area is not used for any fishing activity.

The community commonly believes that the new dock would cause fewer disturbances to the fish population than the existing one, which is located at the mouth of the Coppermine River. This information was confirmed in a letter from the local Hunters and Trappers Association (*Attachment #9).*

4.5 Construction details.

4.5.1 General

The Department is envisaging the construction of the new Marine Resupply Site in stages. The Pipeline and Manifold will be constructed between July 2001 and July 2002. The Marshalling Area and Access Road will be constructed in Sep-Oct 2001. The construction of Breakwater and Access Causeway will take place in Mar-Sep 2002.

4.5.2 Construction of Breakwater and Access Causeway ..... Mar-Apr 2002

This stage involves placing of approximately 18,000 cu m of blasted rock on the seabed and on the beach. It is anticipated that in early spring the sea ice between the shoal and the shoreline will be bottom-fast. The 0.6 m to 1.7 m ice layer, covering the breakwater and causeway footprints will be removed using a bulldozer equipped with ripper and an excavator. Clean blasted rock will be delivered to the resulting pits with dump trucks. Shaping and levelling of the rock will be done with bulldozer.

The Department considered and rejected the summer construction for the following reasons:

- The summer construction would require building and removal of 150 m long and 7 m wide temporary access from shore to the shoal area. This would involve placing of approximately 2,500 cu m rock on the sea bottom. We estimate, at least 30% of this rock would be impossible to recover from the sandy seabed.

- In view of the considerable littoral drift, placing into and removal from the sea of large quantity rock would contaminate the littoral waters for most part of the summer. In attempt to minimise the propagation of the suspended in the water solid particles an 800 m long filtrating floating curtain would most likely have to be installed around the area of construction. This floating curtain could be easily lost to stormy weather, regardless the amount of effort to provide it with reliable anchoring system.

4.5.3 Construction of Wharf and Landscaping of the area..... Aug-Sep 2002

This stage includes:

- Installation of the steel/timber wharf structure
- Placing coarse backfill in the wharf bins and blasted rock around them
- Levelling and placing of 0.1 m gravel layer on top of the Access Causeway
- Shaping the shoulders of the Causeway and the head-slope of the Hammerhead
- General landscape and cleanup of the area.

Heavy equipment such as bulldozer, loader, excavator and dump trucks supported by local labourers would carry out this work. Although most of the work would be carried out near the water edge on top of the Hammerhead base, no need of in-stream work is foreseen.

5. TYPE OF UNDERTAKING (A supplementary questionnaire must be submitted with the application for undertakings listed in **"bold"**)

___ Industrial
___ Mine Development
___ Advanced Exploration
___ Exploratory Drilling
___ Remote/Tourism Camps
___ Municipal
___ Power
X Other (describe): **Construction of Marine Facility.**

6. WATER USE

___ To obtain water
X To modify the bed or bank of a watercourse
___ To alter the flow of , or store, water
___ To divert a watercourse
___ Flood control
___ Other (describe):

7. QUANTITY OF WATER INVOLVED (litres per second, litres per day or cubic metres per year, including both quantity to be used and quality to be returned to source)

NA

8. WASTE (for each type of waste describe: composition, quantity, methods of treatment and disposal, etc.)

___ Sewage
___ Solid Waste
___ Hazardous
___ Bulky Items/Scrap Metal
___ Waste oil
___ Greywater
___ Sludges
___ Other (describe):

9. PERSONS OR PROPERTIES AFFECTED BY THIS UNDERTAKING (give name, mailing address and location; attach if necessary)

The work would be undertaken on a Commissioner's land adjacent to the municipal boundaries of Kugluktuk. The Community Council supports the project *(Attachment #8)*. No neighbouring property would be impacted.

The name and address of the local contact is:

Mr. John Holland
Senior Administrative Officer
Hamlet of Kugluktuk
P.O. Box 271
Kugluktuk, NU X0E 0E0
Tel (867) 982-4471

In addition to your office, we have contacted the following government agencies:

DFO, Habitat Management Office, Iqaluit, NU
DFO, Canadian Coast Guard, Navigable Waters Protection, Sarnia, ON
DIAND, Water Resource Management Board, Lands Division, Yellowknife, NT

Land Use Permit - *PENDING*

DIAND	___ Yes	___ No	If no, date expected _____
Regional Inuit Association	___ Yes	___ No	If no, date expected _____
Commissioner	___ Yes	___ No	If no, date expected _____

10. PREDICTED ENVIRONMENTAL IMPACTS OF UNDERTAKING AND PROPOSED MITIGATION MEASURES (direct, indirect, cumulative impacts, etc.)

NIRB Screening ___ Yes ___ No If no, date expected _____

The potential environmental impacts and the appropriate mitigation measures are summarised below:

10.1 Storage of Materials:

Backfill material, steel and timber components for dock and miscellaneous tools would need to be stored on site.

Mitigation: All materials would be stored safely, well back of the beach. There would be no presence of material contaminating the water body.

10.2 Permanently Disturbing the Seabed:

Breakwater and Causeway will be constructed directly on the seabed and on the beach, thus permanently reducing the feeding opportunities for fish in the area. The footprint of the breakwater on the seabed is 5,000 sq m and the one of the Causeway is 1,200 sq m.

Mitigation: Mitigative measures proposed to compensate for the loss of fish habitat includes cleaning debris and restoration of the shoreline at the site of the existing Marine Resupply site which is located at the mouth of the Coppermine River. Relocating the Resupply site out into the open bay and eliminating the associated marine traffic from the Coppermine River mouth is considered to be highly beneficial for the numerous fish species inhabiting the Coppermine River delta.

10.3 Temporary Disturbing the Seabed:

An ice layer with thickness between 0.6 m and 1.7 m will be removed from the breakwater and causeway footprints on the seabed. Heavy equipment will be travelling on the sea ice in order to deliver rock to the excavated pits.

Mitigation: The ice between shore and shoal will be bottom-fast and no fish will be present in the area at the time of the ice removal. All vehicles and equipment involved in removing the ice and placing the rock will be inspected for leaks and repaired if necessary prior to beginning of the construction activities.

10.4 Debris Fallout:

.1 Foreign material imported into the sea for the construction of breakwater and causeway consists of approx. 18,000 cu m clean blasted rock with zero, or very little fines content. Only other foreign material involved in the construction consists of few dozens survey stakes for the layout.

Mitigation: It is anticipated, very few pieces of rock would fall on the ice from the transporting trucks. This rock will be removed from the ice. All layout stakes will be thoroughly collected and removed from the ice.

.2 During installation of the of the steel/timber wharf structure there is a potential for loose material to enter the water body.

Mitigation: In order to protect the water body during construction, a minimum of 2.5 m wide berm of clean rock fill would remain between the water line and the edge of the structure. Gravel in-fill would be contained into the steel/timber bins. A geotextile membrane would be installed at the base of the structure on the interface between rock and gravel backfill.

10.5 Fuel Spills:

Diesel fuel would be utilised to power the heavy equipment. There is a risk of terrestrial and aquatic contamination. An accidental fuel spill could occur during:

1. Transfer of the fuel from the fuel truck to the machinery,
2. As a result of leakage from working machinery,
3. As the result of a fuel truck accident, en route to or from the work site.

Mitigation: No fuel would be stored on site. All fuel would be supplied by fuel truck. Refuelling of the equipment would take place at an appropriate safe distance from the water body. Prior to beginning the construction PW&S and Community representatives, including the heavy equipment operators, would meet in Kugluktuk to discuss and adopt a comprehensive Spill Contingency Plan proposed by the Contractor.

The plan will be prepared in compliance with the *Environmental Protection Act, Spills Contingency Planning and Reporting Regulations.* The Comprehensive Spill Contingency Plan will include:

- Action Plan outlining procedure for spill reporting and spill clean up,
- Scenarios outlining procedure for potential spills (e.g. fuel truck accident),
- List of emergency contacts and 24 hour phone numbers,
- Identify vulnerable areas on site,
- List of on-site and contact personnel,
- All other pertinent information brought up by local authorities.

11. INUIT WATER RIGHTS

Will the project or activity substantially affect the quality, quantity, or flow of water flowing through Inuit Owned Lands and the rights of Inuit under Article 20 of the Nunavut Land Claims Agreement?

The Marine Development project will not affect the quality and quantity of the seawater in the Kugluktuk area.

If yes, has the applicant entered into an agreement with the Designated Inuit organisation to pay compensation for any loss or damage that may be caused by the alteration. If no compensation agreement has been made, how will compensation be determined?

12. CONTRACTORS AND SUB-CONTRACTORS (name, address and functions)

The Government of Nunavut has decided to award a Construction Contract for this work on Public Tender basis. It is anticipated the Contract will be tendered and awarded in November/December 2001. All stakeholders will be provided with the name of the Contractor after the award.

13. STUDIES UNDERTAKEN TO DATE (list and attach copies of studies, reports, research, etc.)

The site was recommended for development in a Preliminary Engineering Report for Marine Re-supply Relocation Study, Kugluktuk, NU, commissioned by the GNWT, Department of Transportation and prepared by the UMA Engineering Ltd. in March 1999.

14. THE FOLLOWING DOCUMENTS MUST BE INCLUDED WITH THE APPLICATION FOR THE REGULATORY PROCESS TO BEGIN

Supplementary Questionnaire	**X** Yes	___ No	If no, date expected _____
Inuktitut/English Summary of Project *(Attachment #10, #11)*	**X** Yes	___ No	If no, date expected _____
Application fee $30.00 *(Attachment #12)* (c/o of Receiver General for Canada)	**X** Yes	___ No	If no, date expected _____

15. PROPOSED TIME SCHEDULE

X Annual (or) _ Multi Year

Start Date: **March 01, 2002** Completion Date: **September 15, 2002**

Jivko I. Jivkov, P. Eng.	**Principal, Jivko Engineering**		**August 20, 2001**
Name (Print)	Title (Print)	Signature	Date

For Nunavut Water Board use only

APPLICATION FEE **Amount: $_____** **Receipt No.:**

WATER USE DEPOSIT **Amount: $_____** **Receipt No.:**